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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,664	11/07/2002	Hsiao-Ping Lai	AFTP0044USA	8009
27765	7590	03/02/2004	EXAMINER	
NAIPO (NORTH AMERICA INTERNATIONAL PATENT OFFICE) P.O. BOX 506 MERRIFIELD, VA 22116			GUHARAY, KARABI	
			ART UNIT	PAPER NUMBER
			2879	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/065,664

Applicant(s)

LAI, HSIAO-PING

Examiner

Karabi Guharay

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-25 and 27 is/are rejected.
- 7) ☒ Claim(s) 26 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 November 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: .

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. In this instant case,

(1) the feature "at least one second ditch positioned within the bottom substrate" claimed in claims 11 and 24, (2) the feature "at least one third ditch positioned within the bottom electrode", claimed in claims 12 and 25 must be shown or the features canceled from the claims. No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The disclosure is objected to because of the following informalities: In various places of specification, there are typographical errors of not having necessary space between two words. Applicant is advised to correct all these typographical errors in the specification.

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: -----ORGANIC LIGHT EMITTING DIODE INCLUDING DITCHES IN A TOP SUBSTRATE-----.

Claim Objections

Claims are objected to because of the following informalities:

In claim 14, the typographical error of no space between "regionof" in line 2 of page 11, should be corrected.

In claim 26, the typographic error of no space between "thantwice" of line 2 of claim 26, should be corrected.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-13, & 23-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "the predetermined region of bottom substrate" in line 13. Since there is no earlier recitation of "predetermined region of bottom substrate" it is not clear as to what element the limitation is referring. There is insufficient antecedent basis for this limitation in the claim.

Claims 2-13 are rejected for being dependent on claim 1.

Claims 23-25, recite a limitation "the predetermined region". Since there is no earlier recitation of "predetermined region", it is not clear as to what element the limitation is referring. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3, 9-11, and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Park et al. (US 2002/0155320).

Regarding claim 1, Park et al. disclose an organic light emitting diode (Fig 5 and Fig 7) comprising a bottom substrate (42, lines 1-3 of paragraph 0048), a bottom electrode (46) positioned on an upper surface of the bottom substrate, an organic layer (48) positioned on a predetermined region of the bottom electrode (region where EL structure 50 is formed), a top electrode (44) positioned on the organic layer (48, see Paragraph 0049) and a spot glue region positioned on the bottom substrate outside the pre determined region of bottom electrodes 46 (region on the bottom substrate where adhesive 58 resides, Fig 5 & 7), a top substrate (60) positioned parallel with the bottom substrate (42), and a lower surface of the top substrate (60) comprising at least one ditch (two grooves 59) formed within the top substrate and a sealing material (adhesive 58) positioned on the spot glue region of the bottom substrate (42) for binding the top and bottom substrate together wherein the first ditch (groove 59) is used to prevent the sealing material (adhesive 58) from overflowing into the predetermined region of the bottom substrate (see Paragraph 0052).

Regarding claim 3, Park et al. disclose that the top substrate comprises a glass substrate (lines 5-6 of paragraph 0050).

Regarding claim 9, park et al. disclose that the sealing material is composed of epoxy (lines 3-4 of paragraph 0016, and lines 3-4 of paragraph 0073).

Regarding claim 10, Park et al. disclose that the first ditch (99 of Fig 10 and 11) is positioned within the top substrate (100) corresponding to the bottom substrate (82) and between spot glue region and the predetermined region (region for the EL structure 90) and a depth of the first ditch (99) is less than half of a thickness of the top substrate (see Fig 10, and Fig 11, and paragraph 0065).

Regarding claim 11, Park et al. disclose that OLED (Fig 15 & Fig 17) further comprises at least one second ditch (135B) positioned within the bottom substrate and between the spot glue region (148) and the predetermined region (region for the EL structure) and a depth of the second ditch (135B) is less than a thickness of the bottom substrate 142 (see Fig 17 & Fig 15, and paragraph 0074).

Regarding claim 13, Park et al. disclose that a desiccating agent (56 of Fig 5 and Fig 7) positioned in the OLED to prevent the organic layer of the OLED from moistening (lines 1-3 of paragraph 0050).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eida et al. (US 5909081), in view of Taniguchi et al. (US 5239228).

Regarding claim 1, Eida et al. disclose an OLED (Fig 1-Fig 3) comprising a bottom substrate (2), having a bottom electrode (1c) positioned on an upper surface of the bottom substrate, an organic layer (1b) positioned on a predetermined region of the bottom electrode, a top electrode (1a) positioned on the organic layer and a spot glue region (region where the sealing means 5 is located) positioned on the bottom substrate (2) and outside the predetermined region of the bottom electrode (region where EL structure is provided), a top substrate (4) positioned parallel with the bottom substrate (2), a sealing material (5) positioned on the spot glue region for binding the top substrate (4) and the bottom substrate (2, lines 17-40 of column 6).

But Eida et al. fail to disclose at least one ditch formed within the top substrate wherein the ditch is used to prevent the sealing material from overflowing into the EL device and affecting normal operation of the OLED.

However, Tanaguchi et al. disclose an EL device (Fig 8 and Fig 9) including a ditch (53) formed on the top substrate in order to capture excess sealing material in the ditch so as to prevent the sealing material from overflowing into the EL device and affecting normal operation, thus offers high reliability of the device (lines 24-33 of column 7).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have a ditch in the top substrate, as disclosed by Taniguchi et al., in the device of Eida et al., in order to prevent overflow of sealing material into the EL structure and thus not affecting normal operation.

Regarding claim 2, Eida et al. disclose that the bottom substrate comprises glass or metal (line 34 of column 5, & lines 12-20 of column 19).

Regarding claim 3, Eida et al. disclose that top substrate 4 comprises a glass substrate (lines 60-61 of column 25).

Regarding claim 4, Eida et al. disclose that the bottom electrode (1c) comprises indium tin oxide (ITO) and functions as an anode (lines 19-21 of column 7).

Regarding claim 5, Eida et al. disclose that the top electrode (1a) comprises magnesium and functions as cathode of the OLED (lines 12-30 of column 17).

Regarding claims 6-8, Eida et al. disclose that the organic layer further comprises positive hole injecting layer positioned on the bottom electrode, an emitting layer positioned on the hole injecting layer and an electron injecting layer positioned on the emitting layer (lines 66 of column 17-line 3 of column 18). Eida further discloses that this positive hole injecting layer could be made of a material having function of transporting positive holes and also could be made of a material having function of injecting positive holes (lines 23-26 of column 14), similarly teaches that the electron injecting layer can be made of materials having function of electron transport and also be made of material having function of electron injection (lines 15-18 and 50-59 of column 16). Eida further teaches that positive hole injecting layer could be made of two layers each having different material (lines 11-14 of column 16), thus teaches one layer containing hole injecting material (hole injecting layer) and another layer containing hole transporting material (hole transport layer) to transport holes to the emitting layer, thus inherently adjacent to emitting layer, similarly electron injecting layer can be made of

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two layers having different materials, one layer with electron transporting material to transport electrons to the emitting layer, thus resides adjacent to emitting layer, other layer with electron injecting materials (1-11 of column 17). Thus Eida teaches an organic structure having anode/hole injecting layer/hole transporting layer/ emitting layer /electron transporting layer/ electron injecting layer /cathode.

Regarding claim 9, Eida et al. disclose that the sealing material (5) is composed of epoxy (lines 47-52 of column 30).

Claims 14-19, 22-24, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. as applied to claim 1 above, and further in view of Rajeswaran et al. (US 6614171).

Regarding claim 14, Park et al. discloses all the limitations of claim 14 (see Rejection of claim 1), except for at least two OLEDs on the bottom substrate comprising two device regions and a segmented region (separation gap) between two adjacent device regions, instead Park et al. disclose a single OLED on the substrate.

However, Rajeswaran discloses several OLEDs, each forming a pixel (p, lines 8-27 of column 3), arranged on a substrate (back plate 14) at a predetermined gap (spx, spy) between pixels (Fig 1 or Fig 3), in order to make a large area display (Fig 1).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to arrange several organic light emitting devices of Park et al., on a substrate having a predetermined gap between adjacent OLEDs, as discloses by Rajeswaran, in order to provide a large area display.

Regarding claim 15, Park et al. do not explicitly disclose that the bottom substrate comprises one of glass substrate, plastic substrate or metal substrate. However, it is well known that glass, plastic or metal is widely used as a material for substrate in a display device.

Thus it would have been obvious to one having ordinary skill in the art at the time the invention was made to use one of glass, plastic or metal, as the material for the bottom substrate, in the device of Park et al., since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use. See *MPEP 2144.07*.

Regarding claim 16, Park et al. disclose that the top substrate comprises a glass substrate (lines 5-6 of paragraph 0050).

Regarding claim 17, Rajeswaran discloses that the bottom electrode (anode 204a of Fig 6) comprises indium tin oxide (lines 22-25 of column 4). The same reason for combining art as in claim 14 applies.

Regarding claim 18, Rajeswaran discloses that the top electrode (cathode 206 of Fig 6) comprises Mg, Al or Li (lines 11-21 of column 4). The same reason for combining art as in claim 14 applies.

Regarding claim 19, Rajeswaran discloses that the organic layer (see Fig 6) further comprises a hole transport layer (210) positioned on the bottom electrode (anode 204a, 204b), an emitting layer (212) positioned on the hole transport layer (210), and an electron transport layer (214) positioned on the emitting layer (lines 55-58 of column 3). The same reason for combining art as in claim 14 applies.

Regarding claim 22, Park et al. disclose that the sealing material is composed of epoxy (lines 3-4 of paragraph 0016, and lines 3-4 of paragraph 0073).

Regarding claim 23, Park et al. disclose that the first ditch (99 of Fig 10 and 11) is positioned within the top substrate (100) corresponding to the bottom substrate (82) and between spot glue region and the predetermined region (region for the EL structure 90) and a depth of the first ditch (99) is less than half of a thickness of the top substrate (see Fig 10, and Fig 11, and paragraph 0065).

Regarding claim 24, Park et al. disclose that OLED (Fig 15 and Fig 17) further comprises at least one second ditch (135B of Fig 17) positioned within the bottom substrate and between the spot glue region (148) and the predetermined region (region for the EL structure) and a depth of the second ditch (135B) is less than a thickness of the bottom substrate 142 (see Fig 17 & Fig 15, and paragraph 0074).

Regarding claim 27, Park et al. disclose that a desiccating agent (56 of Fig 5 and Fig 7) positioned in the OLED to prevent the organic layer of the OLED from moistening (lines 1-3 of paragraph 0050).

Claims 20-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al. and Rajeswaran et al. as applied to claim 14 above, and further in view of Shi et al. (US 5645948).

Regarding claim 20, combined structure of Park and Rajeswaran, discloses all the limitations of claim 20, except for a hole-injecting layer positioned between bottom electrode (anode, 204a, & 204b) and the hole transporting layer (210).

However, Shi et al. disclose an OLED, having a hole-injecting layer (310 of Fig 3) positioned between anode (304) and hole transporting layer (312, lines 6-9 of column 4). Shi further teaches that providing a hole-injection layer improves the injection efficiency of holes from the anode (lines 11-13 of column 4).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include a hole-injecting layer in the combined structure of Park and Rajeswaran, since this will improve the injection efficiency of holes.

Regarding claim 21, combined structure of Park and Rajeswaran, discloses all the limitations of claim 21, except for an electron-injecting layer positioned between top electrode (cathode, 206) and the electron transporting layer (214).

However, Shi et al. disclose an OLED having an electron-injecting layer (318 of Fig 3) between cathode (306) and electron-transporting layer (316, lines 6-9 of column 4). Shi further teaches that providing an electron injection layer improves the injection efficiency of electrons (lines 11-13 of column 4).

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include an electron-injecting layer in the combined structure of Park and Rajeswaran, since this will improve electron injection efficiency.

Allowable Subject Matter

Claim 26 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Claims 12 & 25 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 12 and 25, prior art of record neither shows nor suggests an OLED comprising all the limitations of claim 12 or claim 25, particularly comprising the limitation of at least one third ditch positioned within the bottom electrode.

Regarding claim 26, the prior art of record neither shows nor suggests the limitation that the segmented region is larger than twice a width of each first ditch. Specification suggests that this particular width of the segmented region is necessary to benefit the cutting process of the OLED, moreover, the prior art does not suggest cutting process along the segmented region.

Other Prior Art Cited

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure :Honda (US 6639246); Forrest et al. (US 5998803).

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karabi Guharay whose telephone number is (571) 272-2452. The examiner can normally be reached on Monday-Friday 8:30 am - 5:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimeshkumar D. Patel can be reached on (571) 272-2457. The fax phone number for the organization is (703) 308-7382.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Karabi Guharay
Karabi Guharay
Patent Examiner
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